

**Method and system for making one or more parts of a recorded data sequence****FIELD OF THE INVENTION**

The present invention relates to a method of marking one or more parts of a recorded data sequence, such as an audio or video program, comprising displaying a representation of the recorded data sequence. Furthermore, the present invention relates to a recording device comprising a data buffer, e.g. semiconductor memory, a recording unit for storing data on a medium such as a hard disk or optical disc, and a processor connected to the data buffer and the recording unit, the processor being arranged for displaying a representation of a recorded data sequence stored in the data buffer, and for receiving user inputs from function keys.

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**PRIOR ART**

In existing recording devices, it is possible to select passages or parts from a recorded data sequence, and to only play back the selected passages. Making the selection is done by entering a begin index pointer and an end index pointer, after which the recording device can play back the selected passage (A-B).

US patent US-A-5,903,264 describes a video delivery system and method for displaying an indexing slider bar. On a television screen, a slider bar is shown with an index marker. A user may shift the index marker over the slider bar to indicate to which position in a video stream or video program he wishes to jump. The user interface comprises buttons to alter the position of the index marker on the slider bar.

International patent application WO02/084667 discloses a method and system for selecting a position in an image sequence. A representation of an image sequence in the form of an elongate bar is indicated on a television screen, with a position indicator. Also, key frames from the image sequence are displayed in smaller format, together with indications of the position of a particular key frame in the elongate bar.

**SUMMARY OF THE INVENTION**

The present invention seeks to provide an improved selection method for selecting parts of an audio and/or video data recording for (semi-)permanent storage, which works more intuitively and more efficient than existing selection methods.

According to the present invention, a method according to the preamble

- 5 defined above is provided, in which the method further comprises selecting a range of data by positioning a pointer between a range start point and a range end point (e.g. the beginning and end of the recorded program), dividing the range in a first sub range and a second sub range, the first sub range comprising the data from the range start point to the pointer, the second sub range comprising the data from the pointer to the range end point, and if the
- 10 pointer is in a range of unmarked data and a first function (Expand) is selected, unmarking the first sub range and marking the second sub range, and if the pointer is in a range of marked data and a second function (Truncate) is selected, marking the first sub range and unmarking the second sub range. The steps of setting the pointer and performing an Expand or Truncate function may be repeated to provide multiple marked parts of the recorded
- 15 sequence.

This method provides for an efficient and consistent method for marking or selecting one or more parts of a recorded data sequence. The method provides a user friendly and intuitive method for marking parts of a recorded data sequence. The initiation of the first or second function may e.g. be provided using separate actions of a user, e.g. a key labelled

- 20 Expand and a key labelled Truncate. Alternatively, as the action related to the function depends on the position of the pointer, the first and second function may be provided using a single action, e.g. a key labelled Marking.

In a further embodiment, the method may further comprise inverting marked and unmarked sub ranges if the first or second function is selected a second time with the pointer at the same position as a first time. Such a toggle function is very helpful, especially in the case of a single key embodying both the first and second function. The toggle function is especially helpful for the first selection, as in that case usually the selected range is unmarked, which would allow only an execution of the first function.

In an even further embodiment the toggle method may be further expanded to multiple effects. The method then further comprises marking both sub ranges when the first or second function is selected a third time with the pointer at the same position as the first and second time. This further expands the functionality of the present method without any additional hardware required.

The recorded data sequence may be a temporarily stored data sequence, e.g. using a semiconductor memory in a recording device, and the method may further comprise storing the marked sub ranges of the temporarily stored data sequence. Using this embodiment, it is e.g. possible for a user to select the parts of a recorded data sequence 5 without any undesired parts (e.g. commercials) and store only the selected parts. In this manner, the storage use of the recording device can be more efficient, especially in a further embodiment, in which the method comprises storing the marked sub ranges on a permanent or semi-permanent storage medium. Such a storage medium may e.g. be an optical (rewritable) disc, or a magnetic storage medium such as a hard disk.

10 Also, the present invention relates to a method of selecting a part of an audio or video program, comprising the steps of displaying a representation of the program, moving a pointer to a first position in the representation, executing an expand function for marking the part of the program extending from the first position to the end of the representation, moving the pointer to a second position in the marked part of the program, executing a 15 truncate function for defining as not marked the part of the program extending from the second position to the end of the representation.

In a further aspect, the present invention relates to a recording device as defined above, in which the processor is further arranged for receiving user inputs from function keys, of which a first function key is arranged for allowing to select a range of data 20 by positioning a pointer between a range start point and a range end point, the processor being further arranged for dividing the range in a first sub range and a second sub range, the first sub range comprising the data from the range start point to the pointer, the second sub range comprising the data from the pointer to the range end point, and, if the pointer is in a range of unmarked data and a first function input is received from the function keys, 25 unmarking the first sub range and marking the second sub range, and if the pointer is in a range of marked data and a second function input is received from the function keys, marking the first sub range and unmarking the second sub range.

The recording device may be implemented as a hard disk recorder, in which a recorded data sequence is first recorded in a (temporary) buffer, e.g. comprising 30 semiconductor memory units. Also, the recording device may be a combined hard disk and DVD recorder, in which a recorded data sequence on the hard disk may again be regarded as a temporary recording, for which the present invention may be applied to mark certain parts of the recording for storage on a DVD (such as a DVD+R or DVD+RW), or a Blu-Ray disc, as mentioned further below.

In a further embodiment, the processor is further arranged to invert marked and unmarked sub ranges if the first or second function is received a second time with the pointer at the same position as a first time. This toggle function can be especially helpful when using a single key to activate both the first and second function.

5 In an embodiment of the present recording device, the first function input is received from a dedicated expand key, and the second function input is received from a dedicated truncate key. Having two keys has the disadvantage for additional hardware, however, the processing of the method can be made more simple.

10 Alternatively, the first function input and the second function input are received from a single input key (Marking key). As the action associated with a key press depends on the position of the pointer being in an unmarked or marked area, this allows to implement the present invention in a very effective manner.

15 The recorded data sequence may be a temporarily stored data sequence, and the processor may be further arranged to store the marked sub ranges of the temporarily stored data sequence. The processor may in an even further embodiment, be further arranged to store the marked sub ranges on a permanent or semi-permanent storage medium using the recording unit.

20 The recording device of the present invention may be used to select one or more sub ranges or parts of a recorded data sequence using a single key press. A range of a recorded data sequence can be split in two sub ranges, of which only one is selected for recording.

#### SHORT DESCRIPTION OF DRAWINGS

25 The present invention will be discussed in more detail below, using a number of exemplary embodiments, with reference to the attached drawings, in which

Figure 1 shows a schematic illustration of a recording device employing a method for selecting a part of a recorded data sequence according to an embodiment of the present invention,

30 Figures 2 – 4 show schematic representations of a program, demonstrating the method of the present invention.

#### DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

Figure 1 schematically shows a recording device 10 comprising an arrangement for selecting a part of a recorded data sequence according to an embodiment of the present invention.

The recording device 10 for selecting a part of a recorded data sequence 5 comprises a microprocessor 11 and a number of other units interconnected via a system bus 12. A data source 16, such as a CATV (Cable Television) receiver which is arranged for receiving a television broadcast signal and providing a data stream or data sequence representing a TV program, is connected to the system bus 12. Also, a buffer 17 being arranged for temporary storing a television program, and a HD (Hard Disk) drive 18 are 10 connected to the bus 12. The buffer 17 may comprise semiconductor memory, such as random access memory. Furthermore, an input/output unit (I/O) 20 is connected to the system bus 12 for providing input and output functions to the microprocessor 11. A display driver 19, being arranged for connecting a display to the recording device 10, is connected to this I/O unit 20, as well as a pointer button 13, an expand button 14, and a truncate button 15. 15 These buttons 13-15 may be arranged as hardware buttons on the recording device 10, but may also be present on e.g. a remote control unit which is used for controlling the recording device 10.

The microprocessor 11 is arranged for processing data from the data source 16, and for storing the data in the buffer 17. After the end of the recording, the data from the 20 buffer 17 may be stored in hard disk drive 18 for later playback. The microprocessor 11 is also arranged for retrieving a representation of a television program that is saved in the buffer 17 or in the hard disk drive 18 and providing it to the display driver 19 for displaying the representation of the television program on the display. The display may be, e.g., a computer screen or a commercially available television set.

25 The microprocessor 11 is further arranged for moving a pointer to a first position in the representation of the program on the display. For example, the microprocessor 11 may be arranged to move the pointer to a point of the representation of the television program that represents the beginning of the television program, by default.

The microprocessor 11 is further arranged for moving the pointer according to 30 the inputs on the pointer button 13 in the representation of the program. For example, in an advantageous embodiment of the present invention, the pointer button 13 may be a double action switch, e.g. in the form of a joystick, being arranged for moving the pointer from the first position in the representation of the program to the left or to the right in order to position the pointer at a point of the representation of the television program that corresponds to the

beginning of a section of the program that the viewer finds interesting and that he or she wishes to record.

The microprocessor 11 is further arranged to retrieve inputs from expand button 14 and from truncate button 15.

5 In an advantageous embodiment of the present invention, the viewer may use the pointer button 13, expand button 14 and truncate button 15 to select parts of the television program for recording onto the hard disk 18, in accordance with the selection method of the present invention as described below. (see further below)

The above embodiment has been described in relation to a microprocessor 11. 10 It will be understood that other types of control units which are properly arranged to execute the methods according to the present invention may be used, such as dedicated electronic circuits (analog, digital or hybrid).

Also, the above embodiment has been described in relation to storage of the selected parts of a recording on a hard disk 18. It will be understood, that other types of 15 (semi-)permanent storage may also be used. Examples thereof include, but are not limited to, optical disc storage ((rewritable) CD, DVD, Blu-ray Disc), magnetic medium storage (hard disk, tape, ...), etc., or even recorders with combined types of permanent storage, e.g. a DVD-HD-recorder.

In the case of an embodiment comprising two types of (semi-) permanent 20 storage, e.g. a recorder having both a hard disk recording unit and a DVD recording unit, the method of the present invention may also be applied to (parts of) a video program stored on the hard disk recording unit, and to store the marked or selected parts on the DVD recording unit. This provides the advantage that programs can be recorded on the hard disk recording unit (having a large storage capacity), and that only certain parts of programs (e.g. a 25 broadcast program without commercial breaks) are selected and recorded permanently on a write once DVD (e.g. a DVD+R), thus using the permanent recording media very efficiently.

In the above embodiment, a data source 16 has been identified, which provides data, such as video and audio data of a CATV receiver, to the recording device 10. Other data sources 16 may also provide video and/or audio data (or even other data) to the recording 30 device 10, such as a tuner, a satellite receiver, a digital terrestrial television receiver, a set-top-box, etc.

In the hard disk recorder 10, the recorded TV programs are temporarily stored in the buffer 17. A user can indicate that a program must be saved, i.e. that it has to remain on the hard disk 18 even if the buffer 17 no longer exists.

The method according to the present invention provides a consistent user interface to mark and select as many parts of the program as required with just two functions. Traditional selection is done by marking a point, moving a pointer and marking another point. The method according to the invention is an improved selection procedure in situations 5 where the traditional selecting cannot be used or is undesirable.

An important feature of the invention is the consistent navigation in and marking of parts of a program to end up with multiple parts that will be saved for recording. Alternately performing two functions, e.g. by pressing two keys, allows marking of as many areas as required in any location as required. These functions are now explained in more 10 detail with reference to Figures 2 to 4.

Say a program has begin- and end positions A and B in a temporary buffer 17 and that p, q, r and s are points in that program, where  $p < q < r < s$ . A pointer can be used to navigate in the area that represents the program. There may be two keys 14, 15 on which the two distinct functions Expand and Truncate are mapped.

15 In a first embodiment, the Expand function only works in unmarked areas, whereas the Truncate function only works in marked areas of the program. Expand expands the area from the pointer position until the end of the program or until the beginning of another area. Truncate truncates the marked area from the pointer position until the end of the program or until the beginning of another area.

20 As can be seen in Figure 2, if the pointer is at position p (in an unmarked area) and the user presses Expand, the area or sub range p-B is marked (left). If p is in a marked area and the user presses Truncate, the area or sub range p-B is unmarked (right).

If, in the left part of Figure 2, the user navigates to any point in the area A-p and presses Expand again, then that would just move the begin point of the marked area. 25 However as shown in Figure 3, if the user presses Truncate while the pointer is in area p-B (at position q), the area p-q is marked and the area q-B is unmarked.

30 Similarly, in the right part of Figure 2, if the user navigates to any point in the area p-B and presses Truncate again, then that would just move the end point of the marked area. However as shown in Figure 3, if the user presses Expand while the pointer is in the area p-B (at position q), the area A-p remains intact and the area q-B now also belongs to the total marked area in A-B.

As shown in Figure 4, alternately pressing Expand and Truncate from marked and unmarked areas results in the division of the program A-B in as many parts (sub ranges) as required. It is useful to go to the right-most area: all Expands or Truncates from any other

position only result in a re-position of the points p, q, r and s. Note that the areas that are next to each other are each other's inverse. That is also what makes this method consistent.

In the embodiment described above, the Expand function and the Truncate function are mapped on two distinct keys 14, 15. Thus in that embodiment, there is an

5 Expand key 14 and a Truncate key 15. As said above, the Expand function only works in an unmarked area and the Truncate function only in a marked area. In another embodiment, the Expand function and the Truncate function are mapped on a single key, e.g. called a Marking key, which may be implemented using one of the keys 14, 15 of Fig. 1. Pressing the Marking key when the pointer is in an unmarked area results in the execution of the Expand function

10 whereas pressing the Marking key when the pointer is in a marked area results in the execution of the Truncate function. This embodiment has the further advantage that only one key is required on the operating device, e.g. remote control, and that the user needs to operate only one key.

In an even further embodiment, also a single key is used as in the above

15 embodiment. However, when the present method is used for the first time, it may be that the program A-B is unmarked, and the user wants to start with a truncate function, which, in the above embodiment, is not possible. This problem is solved by allowing the function of the Marking key to toggle when the pointer is at the same position. Thus, when a user sets the pointer at position p in an unmarked area of program A-B, the first time the key is pressed,

20 the Expand function will be used, resulting in the situation on the left of the second line of Figure 4. When leaving the pointer at the same index location, and pressing the Marking key again, the marking/unmarking of selected areas in the program A-B will be inverted, resulting in the situation on the right of the second line of Figure 4. After that the user may proceed as before.

25 In an even further embodiment, the activation of the Marking key multiple times may have another effect. In an unmarked area A-B with the pointer at position p, the first press would mark sub area p-B and leave sub area A-p unmarked. The second press would invert the sub areas, i.e. mark sub area A-p and unmark sub area p-B. The third press would mark the entire area A-B.

30 This method according to the invention can be used in a hard disk recorder or a combi recorder with a hard disk and a DVD. However, the method can also be applied in other apparatuses where parts of a program or recording need to be selected. The typical application area is where audio and or video data are present and where these data are represented for the user on a display device. For example, the data may be represented by a

bar displayed for the user on the display device whereby the position in the bar corresponds with a time position in the data selected area (e.g. p-q in Figure 4 left), can be regarded as new data area A-B, to which method can be applied again.